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DEVELOPMENT AND VALIDATION OF A
RECRUITER SELECTION BATTERY

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At a time when the military forces are largely dependent on the quantity and quality of volunteers, the criticality of the role played by recruiters in meeting manpower supply requirements cannot be overemphasized. This report describes the development and validation of a battery of primarily paper-and-pencil instruments to identify those individuals most likely to become successful recruiters. Instruments contained in this battery include self-description inventories, biographical data, and vocational interest

measures. This recruiter selection battery was administered to a geographically representative sample of Navy recruiters. Two primary measures of success were used: Ratings gathered from supervisors and peers and production data (i.e., enlisted accessions) compiled over a 6-month period. The magnitude of the relationship observed between the scores on the experimental battery and the various performance criteria, particularly that of production, was sufficiently high to recommend that the battery be operationally implemented.

FOREWORD

This research was conducted in support of advanced development subproject ZPN01.06 (Advanced Navy Recruiting System) and exploratory development task area Z55.521.030 (Prediction of Performance). It was sponsored by the Navy Recruiting Command and Headquarters, Marine Corps (MPI-20).

The report decribes the third phase in the development and evaluation of a test battery for the early identification of those individuals who have the greatest likelihood of performing effectively as Navy and Marine Corps recruiters. The first and second phases of the study were described in NPRDC Technical Reports 76-31 and 79-17. The recruiter selection battery has been recommended for use by the Navy and Marine Corps for predicting the success of those individuals being considered for recruiting duty and is currently being implemented by both the Navy and the Marine Corps.

Special gratitude is expressed to CDR H. Levien, formerly of the U.S. Navy Recruiting Command, for his excellent support throughout this study and to all recruiting personnel who participated in the research.

The contracting officer's technical representative was Dr. Norman Abrahams.

JAMES F. KELLY, JR.   JAMES J. REGAN
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SUMMARY

Problem and Background

The U.S. military has a continuing need to recruit a sufficient number of qualified young persons to man the operating forces. To address this problem, this Center is conducting a three-phase effort to develop and evaluate a test battery for use in identifying those individuals who are most likely to perform effectively as Navy and Marine Corps recruiters. In the first phase, behaviors that contribute to effectiveness as a recruiter were identified and scales were developed to measure these behaviors. In the second phase, a battery of test instruments was validated on a sample of 267 recruiters, using these behavior-based scales. This preliminary validation revealed a number of predictors that were related to performance.

Objective

The objective of this research, the third phase of this effort, was to expand and refine this test battery and to determine its validity for predicting various dimensions of recruiter performance.

Approach

The test battery was revised by including additional experimental items selected on the basis of their hypothesized relationship to the underlying "constructs" of the battery. This revised battery was then administered to 194 Navy recruiters in seven different locations. Two primary measures of success were used: production data compiled over a 6-month period, and ratings gathered from supervisors and peers on four aspects of performance. Analyses were conducted to evaluate both the precision with which the new items measured the constructs and the extent to which those items enhanced test battery validity.

Results and Conclusions

Composites of new items successfully measured their target constructs, and, in about half the cases, enhanced the validity of these constructs. Scales derived from the constructs validly predicted the two major indices of recruiter effectiveness: recruiter productivity (average number of persons recruited) and rated recruiter performance.

Recommendations

1. The Navy and Marine Corps should use the final battery to aid in selecting recruiters.

2. The validity of the final battery should be monitored to ensure its continued usefulness.

3. The performance rating materials should be distributed to recruiter supervisors and field recruiters to aid in training and self-development.

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Problem and Background

The U.S. military has a continuing need to recruit a sufficient number of qualified young persons to man the operating forces. To address this problem, this Center is conducting a three-phase effort to develop and evaluate a test battery for use in identifying those individuals who are most likely to perform effectively as Navy and Marine Corps recruiters.

In the first phase, behaviors that contribute to recruiter effectiveness were identified and scales developed to measure those behaviors.[1] This effort resulted in four scales measuring four performance categories: selling skills, human relations skills, organizing skills, and overall performance. In the second phase, the scales were used to validate results of a test battery consisting of personality, biographical, and vocational interest items that was administered to a sample of 267 recruiters selected from 10 Navy Recruiting Districts.[2] Scores obtained by sample members in the four performance categories, along with an index of recruiter production (i.e., the actual number of personnel recruited), provided the performance criteria for assessing the validity of the scales and their component items. Since personality and vocational interest items were analyzed separately for each of the four performance categories, eight different item pools resulted.[3] These items and categories served as the basis for the present effort.

Purpose

The purpose of this research, the third phase of this effort, was to expand and refine this test battery and to determine its validity for predicting various dimensions of recruiter performance.

APPROACH

Factor Analyses to Identify Valid Constructs

Using the responses of the 267 recruiters to the personality items, intercorrelations were computed within each of the four performance categories and the resulting correlation matrices were factor-analyzed via the principal components method. From two to ten factors were extracted for each category and each solution was rotated to the varimax criterion. The same procedures were employed with the vocational interest item pools using the Strong-Campbell Interest Inventory (SCII) (T 325). Thus, eight different sets of factor solutions were generated, four for the personality items and four for the interest items. These factor solutions are provided in Table 1.

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[1]Borman, W. C., Hough, L. M., & Dunnette, M. D. Development of behaviorally-based rating scales for evaluating the performance of U.S. Navy recruiters (NPRDC TR 76-31). San Diego: Navy Personnel Research and Development Center, February 1976. (AD-A022 371)

[2]Borman, W. C., Toquam, J. L., & Rosse, R. L. An inventory battery to predict Navy and Marine Corps recruiter performance: Development and validation (NPRDC TR 79-17). San Diego: Navy Personnel Research and Development Center, May 1979. (AD-A069 371)

[3]Items were not constrained to appear in only a single pool. In fact, some items appeared in all four interest or personality item pools.

Table 1

Factors Identified for Each Performance Category

Performance Categories	Factor/Construct
Personality Items	
Selling Skills	1. Good impression.
	2. Impulsive, carefree vs. order, planning ahead, systematic, level-headed.
	3. Enjoying being center of attention, leading, showing off, and speaking before a group.
	4. Working hard and with confidence, being happy vs. being unhappy, giving up easily, disgruntled about life.
Human Relations Skills	1. Preference for working with and being with people.
	2. Spontaneity, impulsivity, "fast and careless," rebellious, tendency to have bad moods.
	3. Unhappy, lack of confidence, disgruntled about life.[a]
	4. Ambitious, working hard, pushing self.
Organizing Skills	1. Order, planning ahead, well organized vs impulsive, acting without thinking, "fast and careless."
	2. Leading and influencing others, giving orders, demanding of self, ambitious, dominant.
	3. Unhappy, discouraged, doing little in life, giving up hope, feeling useless.[a]
	4. "Bad actor," was unruly and rebellious in school, unsocialized.[a]
Overall Performance	1. Doing more than expected vs. giving up, working just hard enough.
	2. Impulsive, "fast and careless" vs. order, methodological, planning ahead.
	3. Leading and influencing others, dominant, strong personality.
	4. Good impression vs. admitting occasional meanness, grouchiness, disgust with self, discouragement, uselessness, bad mood.
	5. People oriented, liking to be around others and close to others, open to other people.
Vocational Interest Items	
Selling Skills	1. Interest in extroverted, dominant, leadership activities and occupations.
	2. Interest in occupations involving attention to detail.[a]
	3. Interest in law and politics.
	4. Interest in sports and competitive activities.
Human Relations Skills	1. Interest in dominant, extroverted, social activities.
	2. Interest in teaching and counseling.
	3. Interest in "feminine" occupations and activities.
	4. Interest in newspaper reporting and foreign service.
	5. Interest in sports and competitive activities.
	6. Interest in religion and in being around the sickly.
Organizing Skills	1. Interest in politics and high level management jobs.
	2. Interest in bookkeeping, statistical, and detail work.
	3. Interest in "feminine" occupations and activities.[a]
	4. Interest in leadership and responsibility.
Overall Performance	1. Interest in law and poltics, and management occupations and activities.
	2. Interest in activities and occupations that require extroversion, dominance, responsibility, and leadership.
	3. Interest in sports and competitive activities.
	4. Interest in teaching and counseling.
	5. Interest in "feminine" occupations.[a]

[a]These constructs related negatively to their target performance criteria.

Development of Revised Test Battery

Personality Items

Existing personality items were reviewed, and those items that correlated .10 or greater with the target performance category were included in a new trial battery. This resulted in the selection of 315 items--55, 85, 95, and 80 being selected for the selling skills, human relations skills, organizing skills, and overall performance categories respectively.

To generate new personality items, several personality inventories were reviewed for scales conceptually related to one or more of the 17 constructs identified in the factor analyses (see Table 1). Each item was then examined and those that appeared to tap these same constructs were selected. For example, for the construct, "Leading and influencing others . . . " (No. 3 under overall performance), the item "I try to control others rather than permit them to control me" from the Dominance Scale of the Personality Research Form[4] was selected. In all, 83 items were selected. In addition, 26 new personality items of the same general type as the above example were written, each targeted toward one of the identified constructs. Thus, the revised test battery included 424 personality items.

Vocational Interest Items

Existing vocational interest items were selected for the trial battery based upon one of the following criteria: (1) $r > |.12|$ in the sample of 267 recruiters and $r > .00$ in the same direction in a pilot test sample of 62 recruiters in the same study, or (2) $r > |.24|$ in the sample of 62 and $r > \pm .08$ in the same direction in the sample of 267. This screening procedure resulted in the selection of 202 items--39, 62, 48, and 53 being selected for the selling skills, human relations skills, organizing skills, and overall performance categories respectively.

In addition, 49 new vocational interest items were written to tap the 19 constructs derived from the factor analyses (see Table 1). For example, the item, "College football coach" (to which the respondent answers "like," "indifferent," or "dislike") was written to measure the constructs related to sports interests, and the item, "Keeping track of statistics for baseball, football, etc.," was written to tap the construct dealing with interest in detail work. Thus, the revised test battery included 251 vocational interest items.

Sample

The revised test battery was administered to a sample of 194 Navy recruiters. The distribution of recruiters by geographic location is provided in Table 2.

Criteria

Performance

The rating scales developed by Borman et al. (1976) were used to evaluate the performance of the recruiters in this sample. Ratings were obtained from supervisors and peers.

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[4]Jackson, D. N. Personality Research Form. Goshen, NY: Research Psychologist Press, Inc., 1965.

Table 2

Navy Recruiter Sample

District	N
Albany	30
Baltimore	28
Boston	30
Dallas	27
Detroit	28
Minneapolis	22
San Antonio	<u>29</u>
Total	194

Production

Previous attempts to develop scales to predict production, as reflected by the actual number of accessions, have been largely unsuccessful. However, since production is often perceived as an important measure of recruiter effectiveness, records were gathered for recruiters in this sample. Production was monitored over a 6-month period to determine the average number of accessions per month.

Analyses

1. Performance ratings were factor analyzed to determine whether they related to the four performance categories. Factor scores were computed for each recruiter in the sample.

2. Correlational analyses were conducted (1) to assess how precisely the new items measured their target constructs and therefore how clearly we understood these constructs, and (2) to evaluate the validity of the constructs as indicators of Navy recruiter effectiveness.

RESULTS

Criteria

Table 3 presents the means and standard deviations of performance ratings, along with the peer/supervisor interrater reliabilities. Since the mean ratings range from 6.47 to 7.48 (on a 1-10 scale), it appears that leniency error is not a serious problem here. Also, the standard deviations indicate that the range of the ratings is not severely restricted. Finally, the interrater reliabilities appear to be acceptable and comparable to those obtained in the previous recruiter study (Borman et al., 1979).

Table 3 also includes the results of the factor analysis performed on these ratings. The fact that the three-factor solution--selling skills, human relations skills, and organizing skills--is similar to solutions generated previously (Borman et al., 1979) lends additional stability and meaningfulness to this dimensional structure for describing Navy recruiter performance. The three factors were defined as follows.

Table 3

Means, Standard Deviations, and Interrater Reliabilities of Peer and Supervisor Ratings Pooled Together
(N = 194)

| | | | | Factor Analysis Loadings | | |
Rating Dimension	Mean[a]	SD	Reliability[b]	Selling Skills	Human Relations Skills	Organizing Skills
1. Locating and Contacting Qualified Prospects	6.47	1.49	.77	.57	.47	.41
2. Gaining and Maintaining Rapport	7.20	1.18	.47	.62	.55	.25
3. Obtaining Information from Prospects and Making Good Person-Navy Fits	6.83	1.12	.44	.67	.42	.41
4. Salesmanship Skills	6.92	1.35	.62	.62	.41	.34
5. Establishing and Maintaining Good Relationships in the Community	6.96	1.14	.35	.51	.51	.26
6. Providing Knowledgeable and Accurate Information about the Navy	7.47	1.05	.38	.65	.22	.43
7. Administrative Skills	6.58	1.33	.54	.47	.18	.66
8. Supporting Other Recruiters and the Command	6.87	1.32	.46	.24	.45	.62
9. Initiative	7.17	1.50	.68	.36	.47	.72
10. Judgment	7.10	1.32	.63	.24	.40	.78
11. Confidence	7.26	1.41	.67	.46	.42	.56
12. Achievement Orientation	7.04	1.35	.56	.34	.50	.67
13. Warmth	7.48	1.24	.51	.29	.72	.28
14. Developing Productive Relationships in the Community	7.03	1.20	.46	.30	.69	.39
15. Expending Extra Effort to Aid Applicants or Recruits	7.46	1.08	.34	.36	.65	.39
16. Organization	6.63	1.34	.65	.45	.23	.76
17. Overall Effectiveness as a Recruiter	6.72	1.56	.77	--	--	--

[a]Based on responses to a 10-point scale where 1 = lowest and 10 = highest performance.

[b]Reliability coefficients are intraclass correlations reflecting the reliability of the mean ratings pooled across the two sources.

1.   Selling Skills--Selling Navy effectively to prospects; displaying confidence and effectiveness in the recruiting sequence--prospecting, selling, and closing.

2.   Human Relations Skills--Establishing and maintaining good interpersonal relations with prospects, recruits, and persons in the community.

3.   Organizing Skills--Planning ahead and organizing time efficiently; completing paper work accurately and on time.

The interrater reliabilities of the factor scores completed were .62, .48, and .65, respectively, sufficiently high to allow the factor scores to represent individual recruiters' effectiveness in three different aspects of Navy recruiting. Therefore, the three factor scores and the highly reliable overall performance rating, which provided a summary effectiveness measure, were used as criteria to evaluate relationships between the various personality/vocational interest constructs and recruiter performance.

Predictor Validation

Personality Measures

Table 4 provides the validities of composites, consisting of old items, new items, and old-plus-new items,[5] measuring the constructs identified in the factor analysis (see Table 1), as well as the convergent validity indices (i.e., correlations between the old and new-item composites targeted to measure the same constructs). Since the median correlation between old and new items measuring each construct is .56 ($p < .001$), indicating reasonably high convergent validity, it appears that the new items are tapping substantially the same constructs as the old ones.

Further discriminant validity of the new-item composites is clearly demonstrated: Convergent validity correlations are greater than correlations between each new-item composite and old-item composite measuring different constructs for all but two of 56 such comparisons.[6] These results suggest that, in most cases, the attempts to understand and supplement the original item constructs were successful.

The validities for the old-item composites in the previous sample should, of course, be high because the items contained in those composites were selected, in part, according to their validities in that sample. Validity coefficients of old-item composites in the

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[5]Each "old-item" composite corresponding to a factor (construct) was formed by unit-weighting responses to all items loading sufficiently highly on that factor (and not highly on any other factor) in the N = 267 sample. In other words, an old-item composite for a factor consisted of the unit-weighted marker items for that factor. Each new-item composite (one for each construct) was developed by simply unit-weighting responses to the new-item targeted toward that construct.

[6]To help explain the discriminant validity analysis: For example, the .32 convergent validity coefficient for the "Good impression" construct is greater than the correlations between the new-item composite for "Good impression" and the old-item composites representing (1) "Impulsiveness," (2) "Leading and showing off," and (3) "Working hard," and this same pattern of discriminant validity obtains for almost all of the other new-item composites.

Table 4

Relationships Between Old and New Item Composites and
Validities of These Composites Against Re-rater Performance Ratings

Performance Category	Construct[a]	Old Items (N)	New Items (N)	Convergent Validities: Correlations Between Old and New Items Composites	Validities Against Performance Ratings			
					Old Item Composites in Previous Sample	Old Item Composites in Present Sample	New Item Composites in Present Sample	Old Plus New Item Composites in Present Sample
Personality Items								
Selling Skills	Good impression	4	6	.32**	.18*	.20**	.05	.18*
	Impulsive	15	32	.72**	.23**	.01	.03	.03
	Enjoying being center of attention	18	31	.59**	.29**	.26**	.22**	.27**
	Working hard	15	21	.53**	.30**	.17*	.05	.11
Human Relations Skills	People oriented	13	34	.56**	.23**	.12	.08	.11
	Spontaneity, impulsivity	7	30	.14*	.37**	.08	.23**	.22**
	Unhappy, lack of confidence[b]	7	6	.40**	-.18*	-.14*	-.16*	-.17*
	Ambitious, working hard	10	15	.46**	.30**	.24**	.2?**	.29**
Organizing Skills	Order, planning ahead	25	37	.77**	.31**	.12	.22**	.17*
	Leading and influencing others	16	32	.64**	.26**	.10	.12	.12
	Unhappy, discouraged[b]	13	10	.30**	-.28**	.01	.08	.00
	"Bad actor"[b]	6	10	.21**	-.14*	-.05	-.04	.06
Overall Performance	Working hard	8	12	.51**	.28**	.05	.16*	.13
	Impulsive	10	27	.61**	.15*	.05	.07	.08
	Leading and influencing others	13	37	.64**	.28**	.26**	.31**	.33**
	Good impression	9	11	.62**	.25**	.12	-.02	.08
	People oriented	11	35	.57**	.26**	.07	-.04	.00
All Performance Category Constructs Together[c]	Selling skills	85	88	.73**	.47**	.25**	.19**	.23**
	Human relations skills	55	85	.57**	.46**	.18**	.25**	.24**
	Organizing skills	95	89	.69**	.45**	.09	.22**	.15*
	Overall performance	80	122	.7?	.46**	.21**	.21**	.22**
Vocational Interest Items								
Selling Skills	Extroverted interests	9	7	.69**	.25**	.20**	.20**	.22**
	Interests in detail work[b]	5	2	.65**	-.18*	.00	-.03	.01
	Law and political interests	11	2	.75**	.21**	.13	.15*	.14*
	Sports interests	6	6	.51**	.23**	-.03	.03	.00
Human Relations Skills	Extroverted interests	16	4	.56**	.23**	.23**	.19**	.24**
	Interest in teaching	4	1	.78**	.17*	.13	.07	.11
	"Feminine" interests	8	5	.53**	.24**	.05	.07	.07
	Interest in newspaper work	6	2	.58**	.18*	.16*	.06	.14*
	Sports interests	3	6	.62**	.17*	.20**	.20**	.22**
	Religious interests	5	4	.71**	.22**	.09	.13	.12
Organizing Skills	Interest in politics	16	4	.76**	.23**	.16*	.11	.15*
	Interest in detail work	10	3	.30**	.24**	.03	-.01	.02
	"Feminine" interests	4	2	.52**	-.19**	.08	-.02	.05
	Leadership interests	7	4	.58**	.29**	.01	-.04	-.01
Overall Performance	Law and political interest	11	4	.71**	.21*	.10	.21*	.14*
	Extroverted interests	14	7	.69**	.28**	.23**	.22**	.26**
	Sports interests	6	6	.72**	.21**	.13	.05	.10
	Interest in teaching[b]	5	2	.73**	.19**	.11	.00	.08
	"Feminine" interests[b]	3	0		-.14*	-.03	--	.01
All Performance Category Constructs Together[c]	Selling skills	39	17	.62**	.35**	.19**	.20**	.21**
	Human relations skills	62	22	.69**	.32**	.20**	.21**	.22**
	Organizing skills	48	11	.63**	.37**	.14*	.04	.12
	Overall performance	53	19	.73**	.23**	.21**	.18**	.22**

[a] See Table 1 for more complete definitions of these constructs.

[b] These constructs should relate negatively to their target performance criteria.

[c] For each performance category, a single composite was formed by unit weighting all items contained in the 4, 5, or 6 composites targeted toward that criterion.

*$p < .05$.
**$p < .01$.

present sample (N = 194), however, provide unbiased cross-validity estimates for those composites. While many of these cross-validities are much reduced in magnitude, several suggest reasonably high and consistent relationships between the constructs and performance. These relationships will be elaborated upon more fully below.

Regarding the validity of the new personality items, the data in Table 4 indicate that all but 2 of the 17 validities for the new-item composites are in the proper direction. In addition, 7 of these 17 validity coefficients are significantly different from zero in the predicted direction at the .05 level or greater, indicating at least modest validity against their target performance criteria. For 9 of the 17 constructs, the new-item composites provide validities higher than those provided by the old-item composites. Also, for 9 of the 17 constructs, composites consisting of the old plus the new items show higher validities than do the composites containing the old items alone. In other words, the inclusion of the new items in composites enhanced the validity of those composites for slightly more than half the constructs.

Table 4 also reveals the personality constructs most highly correlated with various aspects of recruiter effectiveness. "Making a good impression" and "Enjoying being the center of attention" are the constructs that correlated highest with selling skills. For the human relations skills category, "Spontaneity, impulsivity" and "Ambitious, working hard" had the highest positive correlations; in addition, "Unhappy, lack of confidence" consistently related negatively to human relations effectiveness. The only construct that related well to organizing skills was "Order, planning ahead." Finally, for the overall performance category, the most highly correlated construct was "Leading and influencing others."

Vocational Interest Measures

The results of the analyses for vocational-interest composites are also presented in Table 4. Again, the new items written to measure the target constructs do, in fact, appear to be successfully measuring those constructs. The median correlations between the new-item composites and the old-item composites (the convergent validities) is .5, (p < .001). Also, discriminant validity is excellent; in all comparisons between convergent validities and correlations between new-and old-item composites not intended to measure the same construct, the magnitude of the convergent validities is greater. Thus, as was the case in the personality domain, the levels of convergent and discriminant validity noted here indicate accurate conceptualization and relatively precise measurement of several vocational-interest constructs.

Finally, the pattern of validities appearing for the interest items is very similar to the pattern noted with the personality items. Old-item composites relate well to performance in the original (N = 267) sample, and, in general, these relationships are lower in the present (N = 194) sample. About half of the validities for the composites containing new items are higher than the validity coefficients provided by old-item composites (7 of 16, 2 ties). Further, for 11 of the 18 constructs[7] considered here, validities of composites consisting of old and new items polled together are higher (in the intended direction) than the validity coefficients obtained when the old items alone form the composites.

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[7]Although Table 1 shows 19 constructs, one (under overall performance) was excluded because no new items were developed for that construct.

The constructs reflecting relatively high and consistent relationships with performance criteria are (1) interests in extroverted, dominant, social, and leadership activities and occupations, (2) interests in sports and competitive activities (for the human relations category only), and (3) to a somewhat lesser extent, interests in law and political activities.

Personality and Interest Composite Scales

Development

Validities for the original personality and vocational interest items were assessed, and items were included in the final scoring keys if they demonstrated consistent validity across the two concurrent validity samples (N = 267 and N = 194). New items were also considered for the scoring keys if they demonstrated good validity in the present sample, provided the direction of the validities was consistent with predictions made when these items were selected or written. For example, the validity of the personality item, "I work hard even if I don't think it will get me ahead," was written to measure the construct, "Working hard." The item's validity proved to be -.19 in the hypothesized direction and large enough in magnitude for the item to be considered for inclusion in the final keys.

To assess potential response distortion, all the original items demonstrating validity were administered to a sample of recruiter applicants (N = 131).[6] For some items, the responses of the applicant group were in a much more socially desirable direction than were those of the validation sample. These items were eliminated from consideration for the final keys because they appeared to be easily faked and therefore very possibly undesirable for use in an actual selection setting.

Unfortunately, similar response rate data were not available for the new items because the battery administered to the applicant sample did not contain these items. Thus, new items that had sufficiently high validity to be considered for the keys were rejected if they appeared to be similar in content to those old items that had been rejected on the basis of differences in response rates. The resulting scoring keys for the personality inventory contain 110 items and the vocational interest keys, 60 items.

In all, the keys yield four separate scores that can be computed from responses to the final battery, one for each effectiveness category (selling skills, human relations skills, organizing skills, and overall performance).

Validity--Rating Criteria

To provide additional perspective on the level of validity associated with the final keys, scores on each key were correlated with performance in the appropriate category in the present sample (N = 194). These correlations are .43, .46, .40, and .43 respectively for the four performance categories, indicating impressive relationships between performance and inventory responses to the keyed items. These correlations may capitalize somewhat

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[6]The applicant sample consisted of 131 fleet personnel who had volunteered for recruiting duty. Members of the sample completed the same inventory battery that was administered to the previous concurrent validity sample (N = 267). The administration set was "for real," with instructions indicating that scores obtained on the inventory might be used to select or reject testees. In fact, however, the battery was not used as a selection device.

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on chance relationships between scores on the keys and performance because items were selected for the final keys on the basis of their correlations with performance in this sample and in the previous sample (N = 267). However, relatively little "shrinkage" in these validities is anticipated because only items with consistent validity across the two samples were selected. Accordingly, these correlations may be considered "upper bound" estimates of validity, although it is likely that they are not gross overestimates of the final keys' validities.

"Lower bound" estimates were also computed. Items that proved to be valid in the previous sample (the "old items") were, for each inventory (i.e., personality, vocational interest, and sales effectiveness inventories), assembled into unit-weighted scales and the validity of each scale was computed in the present sample. Then, disregarding inventory, a single composite of these scales was formed for each performance category and the validity of each of these composites was estimated using the following formula:[9]

$$r_{total} = \frac{\Sigma w_i r_{ci} \sigma_i}{\sqrt{\Sigma w_i^2 \sigma_i^2 + 2\Sigma r_{ij} w_i w_j \sigma_i \sigma_j}}$$

where:

w's, the weights, were all set to 1.0

σ = standard deviations of each composite

r_{ci} = validity of each composite

r_{ij} = correlations between composites

These composite validities, shown in Table 5, are considered lower-bound estimates because they include many items that were later rejected from the final keys due to insufficient levels of validity. Further, they do not contain the new items that proved to be valid in the present sample. Overall, the validity coefficients obtained using upper-bound estimates of the final keys and the lower-bound estimates of the initial keys indicate acceptable levels of validity.

Next, the practical impact of using these keys for selection was examined to determine the relationship between inventory scores and the likelihood of being an above-average performer on each criterion. This examination assumed actual validities midway between the upper- and lower-bound estimates. Results are provided in Figure 1, which shows, for example, that 72 percent of the recruiters in the upper 20 percent on the Selling Skills predictor were successful, compared to only 29 percent of those in the lowest 20 percent.

Validity--Production Criterion

In Borman et al. (1979), it was argued that production "numbers" do not necessarily reflect a recruiter's true contribution to the recruitment effort, especially since administrative reporting of accessions may vary from location to location, thus contaminating production statistics. Production, however, is often used as the sole index of recruiter effectiveness. Therefore, scores on each of the four final keys (in the present sample)

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[9]Guilford, J. P. Fundamental statistics in psychology and education (4th Ed.). New York: McGraw-Hill, 1965.

Table 5

"Lower Bound" Estimates of Validity for
The Final Keys Based on the Initial Keys

| Performance Category	Predictor: Composite Scales	SDs of Composite Scales	Validity Estimates			
			Performance	Personality	Sales Effectiveness	Total Predictor Set--"Lower Bound"
Selling Skills	Personality	7.06	.23	--	--	--
	Sales Effectiveness	17.00	.38	.53	--	.34
	SCII	5.22	.21	.59	.44	--
Human Relations Skills	Personality	6.08	.24	--	--	--
	SCII	7.22	.22	.49	--	.27
Organizing Skills	Personality	5.28	.15	--	--	--
	SCII	7.04	.12	.50	--	.15
Overall Performance	Personality	8.17	.22	--	--	--
	Sales Effectiveness	20.71	.34	.54	--	.31
	SCII	8.51	.22	.67	.39	--

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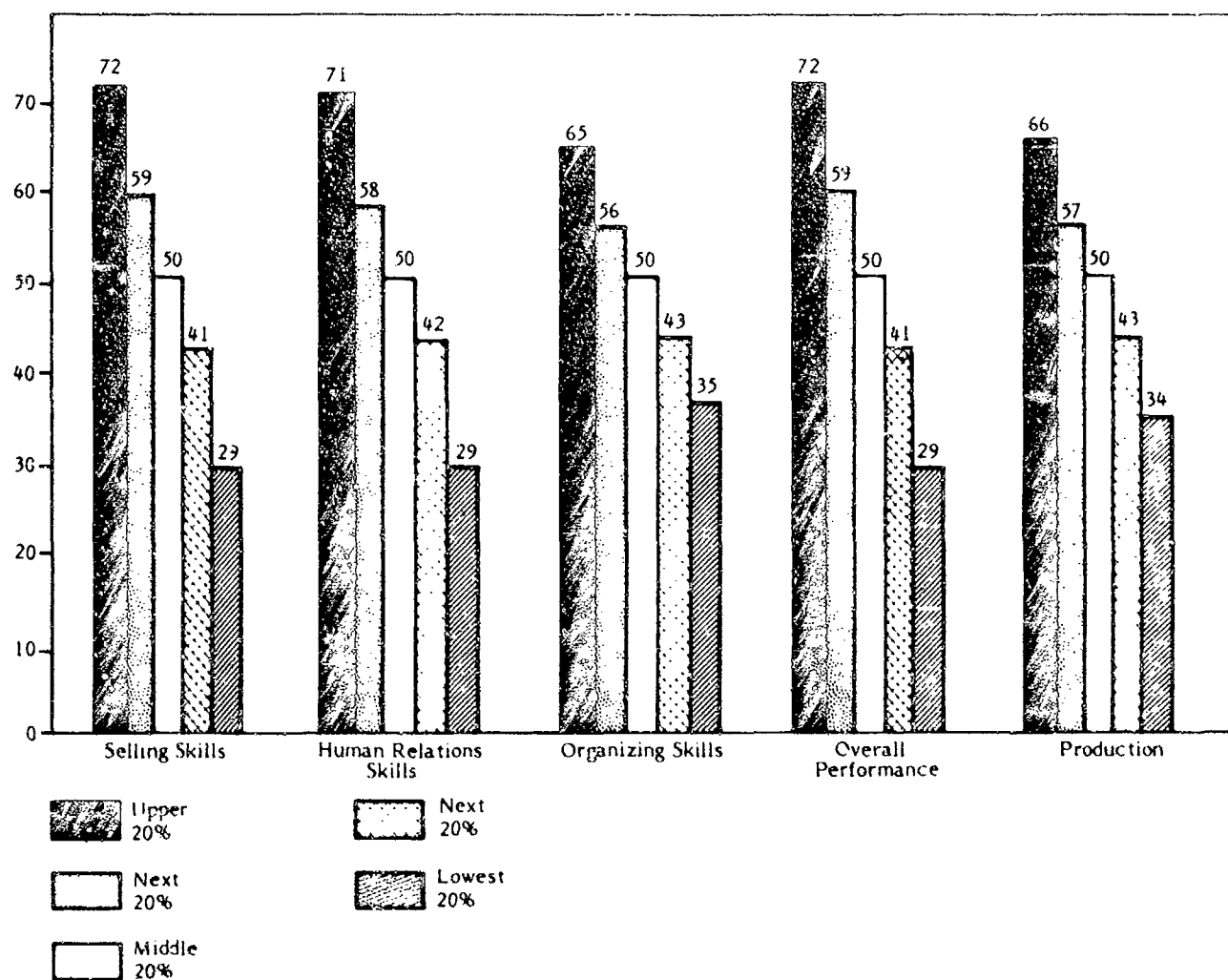
Figure 1. Percent successful recruiters expected where upper 50 percent are considered successful.

were correlated with each recruiter's raw production data (mean number of accessions during the 6-month period of October 1977 to March 1978). As shown in Table 6, the correlations for the four categories are .22, .23, .13, and .26 respectively, with three of the four being statistically significant ($p = .01$). This suggests that the final keys will successfully predict production in Navy recruiting. The magnitude of these correlations is actually impressive, given the amount of error likely to be present in the production data. Thus, the final keys yield four separate scores that may be used to forecast production as well as to predict performance, the criteria for which they were specifically deve'oped.

When the four separate scores are summed into a composite, they correlate .27 with production. The practical significance of this relationship is also depicted in Figure 1. As shown, 66 percent of the recruiters scoring in the top 20 percent were in the upper 50 percent in production, compared to 34 percent of those scoring in the lowest 20 percent.

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Table 6

Validity of Final Keys for
Predicting Production
(N = 194)

Predictor Key	Correlation with Production
Selling Skills	.22*
Human Relations Skills	.23*
Organizing Skill	.13
Overall Performance	.26*

*p < .01.

To examine the utility of these selection procedures in a slightly different way, recent data indicated that the average monthly production per recruiter is 2.5 accessions with a standard deviation of 1.3. The estimated monthly production for those recruiters who score in the top 50 percent on the predictor composite is 2.80; accordingly, this group's average production would be fully 12 percent greater than the current overall average.

DISCUSSION AND CONCLUSIONS

The primary purpose of this research has been to develop measures predictive of Navy and Marine Corps recruiter performance. The procedures presented here succeeded in identifying personality and vocational interest constructs related to one or more aspects of recruiter effectiveness, and attempts to develop additional parallel measures of these constructs were successful.

The process used in this study of isolating individual differences constructs that are important for job performance has provided one way to gain understanding of individual differences/job performance linkages. These techniques have aided in the development of a test battery for predicting recruiter effectiveness and should be considered for use in other research and development programs.

RECOMMENDATIONS

1. The Navy and Marine Corps should use the revised test battery to aid in selecting recruiters.

2. The validity of the battery should be monitored to ensure its continued usefulness.

3. The performance rating materials should be distributed to recruiter supervisors and field recruiters to aid in training and self-development.

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